

# ALDER DECLINE IN AUSTRIA CAUSED BY A HYBRID *PHYTOPHTHORA*

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## Abstract

Species of alder trees are important components of riparian ecosystems and have great conservation value especially in wetlands and along rivers where they stabilize riverbanks. For about 15 years they have suffered from a lethal *Phytophthora* disease. The species of *Phytophthora* that is infecting alder is considered to be a new one that represents a hybrid involving *P. cambivora* as one parent.

The disease is widespread in Austria but is particularly severe in the provinces of Burgenland and Styria, where most alder plantations are located. Extensive decline and symptomatic trees were observed in many plantations, where the disease has increased quickly with devastating consequences. However, in plantation settings the number of diseased or dead trees varied greatly from site to site. Affected alder trees also were found in high elevation native alder habitats along whitewater streams.

The alder *Phytophthora* (and *P. cambivora* (A<sup>2</sup>)) was recovered from soil samples taken from nursery beds providing evidence that nurseries maybe the inoculum source for infected plantations and native alder habitats adjacent to plantations. However, isolation success from

soil at infested sites was very low, whereas isolation frequencies from fresh expanding necrotic stem and bark tissue were high. The number of successful isolations from older necrotic tissues varied but primarily depended on whether or not the necrotic tissue was removed from fresher portions of the lesions.

Three previously described variants were detected among the 32 isolates collected from alder. Most isolates were placed in group I (43.7%) resembling the 'Swedish' variant. The second most common group of isolates (34.4%) resembled the 'standard' variant (group II) and a third group of isolates (9.4%), resembled a less common 'Dutch' variant. In this study, two isolates were recovered which differed from all others by producing very few and often aborted oogonia and hyphae that resembled *P. cambivora*. This is in contrast to a previous Austrian survey where almost all isolates resembled the 'standard' variant (group II). The degree of isolate variation noted at some sites (i.e. three variants out of four isolates at one site) suggests the unstable status of the *Phytophthora* population. This may indicate an ongoing genetic hybridization process.